IN THE CLAIMS:

Please enter the following claims as amended:

1. (amended herewith) A device for fatigue testing of materials comprising a frame, first and second clamping means for holding a specimen to be tested, mounting means to mount the first and second clamping means on the frame, the mounting means vibrationally isolating the first and second clamping means from the frame, means to move at least one of the first and second clamping means to apply in use a low cycle load on the specimen in an axial direction, means to measure the low cycle load, vibration excitation means acoustically coupled to one of the first and second clamping means to apply in use a high cycle load on the specimen, means to measure the high cycle load, detector means to detect vibration of the specimen and to produce an electrical signal, control means to receive the electrical signal, the control means determining the resonant frequency of the specimen from the electrical signal and sending a signal to the vibration excitation means to maintain the high cycle load at the resonant frequency of the specimen and means to store data of the test, said vibration excitation means comprising an actuator, said actuator being mechanically and acoustically coupled to one of the first and second clamping means through a drive member comprising ~~a drive arm~~ and said actuator and said drive ~~arm~~ member being located to one side of the said one of the first and second clamping means to apply the high cycle load transversely to the low cycle load, said drive member having a stiffness, said stiffness of the drive member being such that the mass of the drive member and actuator have a natural resonant frequency close to the resonant frequency of the specimen .

2. (amended A device as claimed in claim 1 wherein the mounting means comprises a first leaf spring to mount the first clamping means and a second leaf spring to mount the second clamping means.

3. (original) A device as claimed in claim that 1 wherein the resonant frequency of the mounting means and first and second clamping means is arranged to be lower than the resonant frequency of the specimen.

Claim 4 was previously cancelled.

5. (previously amended) A device as claimed in claim 1 wherein the actuator is arranged to generate frequencies in the range 15 hertz to 5kHz.

Claim 6 was previously canceled.

7. (previously amended) A device is claimed in claim 1r wherein the actuator is an electrodynamic, piezoelectric or a magnetostrictive actuator.

8. (original) A device as claimed in claim 1 wherein there are heating means to heat the specimen.

9. (previously amended) A device as claimed in claim 8 wherein the heating means comprises a furnace surrounding the specimen.

10. (original) A device as claimed in claim 1 wherein electrical insulating means electrically insulate the frame from the specimen.

11. (original) A device as claimed in claim 10 wherein there are means to supply an electrical current through the specimen, probes arranged on opposite sides of a crack on the specimen to produce a second electrical signal, means to determine crack growth rate arranged to receive the second electrical signal and to determine the rate of crack growth in the specimen.

12. (original) A device as claimed in claim 1 wherein the means to store data stores the life of the specimen to the initiation of the first crack.

13. (original) A device as claimed in claim 1 wherein the means to store data stores the life of the specimen to failure.

14. (Amended herewith) A method of fatigue testing of materials using a device comprising a frame, first and second clamping means for holding a specimen to be tested, mounting means to mount the first and second clamping means on the frame, the mounting means vibrationally isolating the first and second clamping means from the frame, means to move at least one of the first and second clamping means to apply in use a low cycle load on the specimen in an axial direction, means to measure in the low cycle load to, electrical insulating means to electrically insulate the frame from the specimen, vibration excitation means acoustically coupled to one of the first and second clamping means to apply in operation a high cycle load on the specimen, said vibration excitation means comprising an actuator, said actuator being mechanically and acoustically coupled to one of the first and second clamping means through a drive member ~~comprising a drive arm~~ and said actuator and said drive ~~arm~~ member being located to one side of the said one of the first and second clamping means to apply the high cycle load transversely to the low cycle load, said drive member having a stiffness, said stiffness of the drive member being such that the mass of the drive member and actuator have a natural resonant frequency close to the resonant frequency of the specimen , means to measure the high cycle load, detector means to detect vibration of the specimen and to produce an electrical signal, control means to receive the electrical signal, the control means determining the resonant frequency of the specimen from the electrical signal and sending a signal to the vibration excitation means to maintain the high cycle load at the resonant frequency of the specimen and means to store data of the test, the method comprising the steps of:

(a) applying one of a low cycle load and a high cycle load to the specimen,

(b) maintaining the vibration of the specimen at its resonant frequency,

(c) detecting a drop in the resonant frequency of the specimen indicative of the initiation of a crack in the specimen,

(d) stopping the test and locating the crack,

(e) attaching probes to the specimen at each side of the crack, the probes being arranged to produce a second electrical signal,

(f) supplying an electrical current through the specimen,

(g) resuming the test and maintaining the vibration of the specimen at its resonant frequency until failure of the specimen occurs,

(h) determining one of the rate of crack growth in the specimen from the second electrical signal and determining the life of the specimen to failure.

15. (original) A method as claimed in claim 14 comprising applying tensile load and bending mode vibrations on the specimen.

16. (original) A method as claimed in claim 14 comprising applying tensile load and torsion mode vibrations on the specimen.

17. (original) A method as claimed in claim 14 wherein the specimen is aerofoil shaped.

18. (original) A method as claimed in claim 14 comprising heating the specimen.

19. (original) A method as claimed in claim 14 wherein step (c) comprises determining the life of the specimen to the initiation of the first crack.

20. (original) A method as claimed in claim 14 wherein step (d) comprises heating the specimen to oxidise and colour the surfaces of the crack on the specimen.

21. (original) A method as claimed in claim 14 wherein step (b) comprises maintaining the vibration of the specimen at a predetermined amplitude of vibration.

22. (original) A method as claimed in claim 21 comprising determining the amount of energy required to vibrate the specimen at the predetermined amplitude of vibrations at the resonant frequency of the specimen.

23. (original) A method as claimed in claim 22 wherein the specimen comprises a damping treatment.

24. (Amended herewith) A device for fatigue testing of materials comprising a frame, first and second clamping means for holding a specimen to be tested, mounting means to mount the first and second clamping means on the frame, the mounting means vibrationally isolating the first and second clamping means from the frame, means to move at least one of the first and second clamping means to apply in use a low cycle load on the specimen, means to measure the low cycle load, electrical insulating means to electrically insulate the frame from the specimen, vibration excitation means acoustically coupled to one of the first and second clamping means to apply in operation a high cycle load on the specimen, said vibration excitation means comprising an actuator, said actuator being acoustically coupled to one of the first and second clamping means through a drive ~~member comprising a drive arm~~ and said actuator and said drive ~~arm~~ member being located to one side of the said one of the first and second clamping means to apply the high cycle load transversely to the low cycle load, said drive member having a stiffness, said stiffness of the drive member being such that the mass of the drive member and actuator have a natural resonant frequency close to the resonant frequency of the specimen, means to measure the high cycle load, detector means to detect vibration of the specimen and to produce an electrical signal, control means arranged to receive the electrical signal, the control means determining the resonant frequency of the specimen

from the electrical signal and sending a signal to the vibration excitation means to maintain the high cycle load at the resonant frequency of the specimen, probes being provided on the specimen in use and to produce a second electrical signal, means to supply an electrical current through the specimen, means to determine crack growth rate arranged to receive the second electrical signal and to determine the rate of crack growth in the specimen or determining the life of the specimen to failure .

25. (original) A device as claimed in claim 24 wherein the mounting means comprises first leaf spring to mount the first clamping means and a second leaf spring to mount the second clamping means.

26. (original) A device as claimed in claim 24 wherein the resonant 20 frequency of the mounting means and first and second clamping means is arranged to be lower than the resonant frequency of the specimen.

27. was previously cancelled.

28. (previously amended) A device as claimed in claim 24 wherein the actuator is arranged to generate frequencies in the range 50Hz to 5kHz.

29. was previously cancelled.

30. (previously amended) A device as claimed in claim 24 wherein the actuator is an electrodynamic, piezoelectric or a magnetostrictive actuator.

31. (original) A device as claimed in claim 24 wherein there are heating means to heat the specimen.

32. (previously amended) A device as claimed in claim 31 wherein the heating means comprises a furnace surrounding the specimen.

33. (original) A device as claimed in claim 24 wherein the means to store data stores the life of the specimen to the initiation of the first crack.

34. (original) A device as claimed in claim 24 wherein the means to 10 store data stores the life of the specimen to failure.

35. (original) A device as claimed in claim 24 wherein there are means to heat the specimen to oxidise and colour the surfaces of the crack on the specimen.

36. (original)A device as claimed in claim 24 wherein the control 15 means determines the amplitude of vibration of the specimen from the electrical signal and sends a signal to the vibration excitation means to maintain the high cycle load at a predetermined amplitude of vibration.

37. (original) A device as claimed in claim 36 wherein the control 20 unit determines the amount of energy required to vibrate the specimen at the predetermined amplitude of vibration at the resonant frequency of the specimen.

38. (original) A device as claimed in claim 37 wherein the specimen comprises a damping treatment.